 CONFIDENTIAL DPD-76 ?-?-61 Copy 1 of ??

Via : AD (Dr. H. L. Dryden) December ?, 19??
R (Mr. I. H. Abbott) Original signed by Ira H. Abbott
RA (Mr. A. J. Evans)

NASA/AF/FAA Sonic Boom Flight Program

Reference: Memo to Dr. Dryden from Mr. Bates dtd 9/5/61 GFB:t?

1. The purpose of this memo is to provide a report on the current status of the subject program as requested in telephone conversation with Miss Dibella. The subject flight program can be considered to be in four phases:

Phase I - Ground measurements

Phase II - Probe flights

Phase III - Community response

Phase IV - Building response

Phase I - which was briefly described in the reference memo has been completed. A total of 60 successful flights were completed in the period September 1 to October 17, 196?. 39 of the flights were fighter aircraft (F-104) and 21 were bomber aircraft (B-58)--at supersonic Mach numbers up to 2. at altitudes ranging from 10,000 feet to 53,000 feet for the fighter and 10,000 feet to 70,000 feet for the bomber. Boom overpressures on the ground were obtained as planned including data on some "super-booms" caused by aircraft maneuvers and straight and level accelerations. A report describing the scope of the tests, operational procedures, and preliminary test results has been prepared and edited at Langley and should be transmitted to Headquarters within two weeks.

Phase II - was also conducted at Edwards Air Force Base and has recently been completed. A total of eight successful flights were made in two test periods--October 2? to November 1, 1961 and November 15 to November 28, 1961. Phase II tests had the objective of obtaining pressure data in the "near field" of a large aircraft flying at supersonic speeds to study the details of "boom" generation. In these flights, a specially instrumented probe airplane (F-106) was flown in close proximity of a B-58 flying at supersonic speeds. The data obtained is currently being processed at Langley.

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Phase III - 21 special flights were accomplished with both bomber (B-58) and fighter (F-106) aircraft during the periods November 6 to November 12 and November 29 to December 3, 1961 in the greater St. Louis area, for the purpose of studying public acceptance of sonic booms. All of the flights were accomplished at a nominal altitude of 41,000 feet and at Mach numbers of 1.5 and 2.0 for the bomber and fighter aircraft respectively.

Weather measurements and observations, seismic measurements (in cooperation with St. Louis University) and sonic boom pressure measurements were made. During the flight period, sample interviews of area residents were obtained by the National Opinion Research Council (NORC). NORC is under contract to NASA (Langley) for this project. Interviewing started on November 13 and will continue until mid-December. Any complaints arising from the flight test program were channeled through the Joint Air Group Office at Scott AFB. The types of data obtained from the Phase II tests and those tentatively assigned responsibility for processing the data are as follows:

(1) Sonic boom pressure measurements and tracking data - NASA Langley

(2) Weather data - Weather Bureau (Proposed to be accomplished by a weather analyst under supervision of NASA and ASD personnel)

(3) Community interviews - NORC under NASA Langley contract

(4) Building response and damage - Clark, Buhr and Mixsen under NASA Langley contract

(5) Seismic measurements - Unassigned at present

(6) Overall documentation of project and procedures used - Dr. Charles Nixon, Bio-Acoustics Branch, Wright-Patterson Air Force Base, Ohio

It is believed that the analyses associated with items (3) and (4) will not be completed before May of 1962, whereas the other items which require less analyses may be completed in the near future.

Because of the widespread interest in this particular project, and because of the need to disseminate the information obtained to many interested groups, it has been propose

that a document be prepared which would describe the conditions of the tests, the procedures used, and where possible, some of the preliminary results. Since much analysis work is required in both the interview and building response phases of this project, the final analyses will not be available for several months. It is believed that an interim document of a preliminary nature would serve a useful purpose and that subsequently this might be published as a final report after the analyses have been completed. Tentative plans at present are for Dr. Charles Nixon to collect the basic information from the sources indicated above and to prepare this preliminary report in order that it might be available for distribution shortly after February 1, 1962.

There is a tentative schedule for additional flights on January 3 and January 6, 1962 in case these are deemed desirable as a result of information generated from the flights accomplished to date. Such flights would be accomplished either at a reduced or increased altitude for the purpose of studying community response.

Phase IV - will be conducted in the Wallops Island area beginning on December 6, 1961 and scheduled to be completed December 18 using F4H aircraft (four flights) from the Patuxent Naval Air Station and F-104 aircraft (five flights) from Wright-Patterson Air Force Base. Government-owned buildings including a two-story, frame-construction, residential-type dwelling and one-story, frame-construction building have been instrumented to measure accelerations and strains of main structural components and pressure loading on external surfaces. Weather data, seismographic data, and tracking data will also be obtained. In all, the equipment is presently installed to obtain 70 channels of information. It should be pointed out that no damage to buildings is anticipated. If any damage occurs, it will be inadvertant. In addition to the flight data to be obtained, it is planned to utilize the instrumentation that has been installed to measure wind loads during storms, to measure the building response during operation of a blast tube that is located in the vicinity of the building, and to measure building response during the launching of one or two missiles that are scheduled in the near future. These data will be used for correlation purposes and the latter and the missile launch data should be of some value to launch operations people.

Copy to: AA (Dr. Seamans)

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